REMARKS

This paper is in response to the Office Action mailed January 18, 2012 ("the Office Action"). By the foregoing amendment, claims 21, 24, 26 and 28 were amended and new claims 31-40 were added in order for Applicants to more particularly claim what they regard as their invention. Claims 21-40 are now pending and presented for consideration on the merits. Applicants respectfully request reconsideration of the application in view of the above amendments to the claims and the following remarks. For Examiner's convenience and reference, Applicants present remarks in the order that the Office Action raises the corresponding issues.

Amendments to Claims 21, 24, 26 and 28

Applicants amended claims 21, 26 and 28 in order to more explicitly emphasize that which was already stated in the claims prior to this amendment. Claim 21 was amended to further emphasize that the solid support forms part of the slurry (*i.e.*, is not merely contacted by a slurry), which was already implicit in claim 21 and argued in the previous amendment. Claims 26 and 28 were amended to further emphasize that the process yields a selective catalytic reduction catalyst, which was explicitly recited by the claims prior to this amendment.

Method claim 24 was amended to properly depend from method claim 21 rather than composition claim 22.

Accordingly, none of the claim amendments has the effect of narrowing the claims for a reason related to patentability but rather only to make more explicit that which was already recited in the claims as previously presented.[1]

New Claims 31-40

New claims 31-40 were added in order to claim additional aspects of the invention disclosed in the Application. Support for new claims 31-33 is found at page 3, lines 22-24 of the Application. Support for new independent claim 34 is found at page 3, line 27 to page 4, line 4 of the Application. Support for new independent claim 38 is found at page 4, lines 5-11 of the Application. Support for dependent claims 35-37 and 39-40 is found in the existing claims. No new matter is added by these claims.

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[1] Because the claims were not narrowed for a reason relating to patentability (*i.e.*, to distinguish over the cited art), a subsequent office action that raises a new ground of rejection must be non-final). *See* MPEP 706.07(a).

Rejection under 35 U.S.C §103(a)

The Office Action rejects claims 21-30 under 35 U.S.C §103(a) as being unpatentable over Kleeman (Investigation of...analysis) in view of Stiles (US 3,515,109). Applicants respectfully traverse this rejection on the grounds that the Office Action fails to make a *prima facie* case of obviousness and fails to establish a proper motivation to modify Kleeman in view of Stiles.

Under 35 U.S.C §103(a), "[a] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." According to MPEP §2142, "[t]he examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness." Finally, MPEP 2141.III notes that:

> "The key to supporting any rejection under 35 U.S.C. 103 is the ***clear articulation of the reason(s) why the claimed invention would have been obvious.*** The Supreme Court in KSR noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Court quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that "'***[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.***'" *KSR*, 550 U.S. at ___, 82 USPQ2d at 1396." [Emphasis added.]

Claim 21 recites a process for the preparation of a catalyst composition. The process includes:

> providing a solid support comprising TiO_2 in an amount of at least 70 wt.%, WO_3 in an amount of 5-20 wt.%, and optionally SiO_2 in an amount of up to 15 wt.%;
>
> contacting the solid support with a vanadate (REVO4) of at least one rare earth metal (RE) selected from the group consisting of Y, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Er and Yb to form a slurry comprising the solid support and vanadate ($REVO_4$); and
>
> drying and calcining the slurry to yield the catalyst composition.

(i) Failure to Make a *Prima Facie* Case

Notably, claim 21 recites forming a "slurry" including "the solid support" and rare earth vanadate (*i.e.*, both the solid support and rare earth vanadate make up the "slurry"). The Office Action fails to make a *prima facie* case because neither Kleemann nor Stiles describes the formation of a "slurry" that includes both a "solid support" and a "rare earth vanadate". Moreover, the Office Action fails to provide any explanation as to how or why one of skill in the art would modify Kleemann using Stiles to form a slurry includes both a solid support and a rare earth vanadate.

In accordance with Applicant's understanding, Kleemann is a scientific paper for "Investigation of the ammonia adsorption on monolithic SCR catalysts by the transient response analysis." According to Kleemann, a comparison of the capability of adsorbing ammonia onto a catalyst comprising V_2O_5-WO_3/TiO_2 with that of a catalyst comprising V_2O_5/TiO_2 was conducted. As indicated in the Office Action, Kleemann is completely silent on rare earth metals and, especially, completely silent on earth metal vanadates. Kleemann does use an ammonium metavanadate, but it is well known that ammonium metavanadates are not rare earth vanadates.

Moreover, the Office Action asserts that the TiO_2 and WO_3 components are in the form of a slurry. "Since there is not any other component present in the suspension … [i]t is obvious that slurry is formed because TiO_2 and WO_3 are powders and their presence in the suspension would form slurry." Office Action, page 2. In response, Applicants note that, while TiO_2 and WO_3 may be in powder form at some point during the process in Kleemann and may therefore arguably form a "slurry" just prior to being impregnated into the "monolithic cordierite honeycombs designated K50 and K64", the TiO_2 and WO_3 components are no longer in powder form and therefore do not and cannot form a "slurry" at the time when the "dried and calcined" monolithic cordierite honeycombs already impregnated with TiO_2 and WO_3 are thereafter impregnated with ammonium vanadate. Kleeman, page 232, right column, lines 9-18. Thus, Kleemann neither teaches nor suggests a process whereby a slurry is formed comprising the solid support formed from TiO_2 and WO_3 and a vanadium salt or other compound.

Stiles is equally deficient in this regard. The Office Action asserts that "Stiles, drawn to process for applying catalytic coatings, discloses rare earth vanadate catalyst coating on the support by forming slurry (col. 8, lines 63-74). Said slurry can be applied to the surface of the support. The coating is dried and calcined afterwards." Office Action, pages 2-3. First (as

Applicants will show more fully hereafter), Stiles only discloses a broad genus that generally encompasses hundreds, if not thousands, of possible species of catalyst metal compounds but fails to disclose the species or sub-genus "rare earth vanadate". Second, Stiles only discloses formation of a slurry consisting of the catalyst compound, which can then be "applied" to a solid catalyst support, such as by "spraying, dipping or immersion". Nowhere does Stiles disclose or suggest a process in which a slurry is formed that comprises both a solid support and a catalyst of any kind, much less a rare earth vanadate. Accordingly, even if one were to combine the teachings of Kleeman and Stiles, the combination would still fail to teach or suggest the combination of elements recited in claim 21 as previously presented and now amended for additional emphasis. More importantly, the Office Action fails to show how or where either Kleeman or Stiles discloses a process in which a slurry is formed that comprises both a solid support and a rare earth vanadate. The alleged "slurry" of Kleeman is only formed, if at all, during impregnation of the monolithic cordierite honeycombs with the TiO_2 and WO_3 components. It does not exist at the time when the monolithic cordierite honeycombs that have been impregnated with the TiO_2 and WO_3 and then calcined are *thereafter* contacted with a vanadate compound or solution. For this reason alone, the Office Action fails to state a *prima facie* case of obviousness of the claims over Kleemann and Stiles.

Moreover, the Office Action acknowledges that Kleeman fails to disclose or suggest forming a slurry that includes a rare earth vanadate. Applicants submit that Stiles is also deficient in this regard. Stiles discloses a broad genus of possible catalysts that contains hundreds, if not thousands of possible metals or combinations:

> By the use of the process of the invention, finely divided particles of the (A) (i) oxides, hydroxides, carbonates, chromates, chromites, cerates, vanadates, stannates, ferites, arsonates, antimonates, uranates, tungstates, manganites, and molybdates of (A) (ii) nickel, cobalt, manganese, silver, iron, chromium, calcium, strontium, barium, cadium, zinc, tin, mercury, bismuth, palladium, platinum, ruthenium, uranium, arsenic, antimony, thallium, zirconium, copper, lanthanum and the rare earths; (A) (iii) elemental platinum, palladium, ruthenium, rhodium, iridium, or osmium can be applied to supports by mixing them in a solution containing at least one ammine from the group of ammines of nickel, cobalt, copper, zinc, palladium, cadmium, barium, silver, and the like. Further, separately prepared ammines can be used, such as ammines of platinum, iron, manganese, the rare earths and the like.

Col. 1, lines 51-68.

According to well-knowN rules applicable when a large genus is disclosed but not the claimed species, the Examiner must consider the size of the genus, compare the species actually disclosed in the cited art to ascertain whether they are similar to the claimed species, and also identify whether the reference contains any suggestion that would lead one of skill in the art to the claimed species. MPEP 2144.08. More particularly, the Examiner must "[c]onsider the size of the prior art genus, bearing in mind that size alone cannot support an obviousness rejection. See, e.g., *Baird*, 16 F.3d at 383, 29 USPQ2d at 1552 (observing that 'it is not the mere number of compounds in this limited class which is significant here but, rather, the total circumstances involved'). MPEP 2144.08(4)(a). The Office Action fails to do this.

In addition, "[o]nce the structure of the disclosed prior art genus and that of any expressly described species or subgenus within the genus are identified, Office personnel should compare it to the claimed species or subgenus to determine the differences. Through this comparison, the closest disclosed species or subgenus in the prior art reference should be identified and compared to that claimed. Office personnel should make explicit findings on the similarities and differences between the closest disclosed prior art species or subgenus of record and the claimed species or subgenus including findings relating to similarity of structure, chemical properties and utilities. MPEP 2144.08(2). The Office Action fails to do this also.

Finally, "[i]f the prior art reference expressly teaches a particular reason to select the claimed species or subgenus, Office personnel should point out the express disclosure and explain why it would have been obvious to one of ordinary skill in the art to select the claimed invention. An express teaching may be based on a statement in the prior art reference such as an art recognized equivalence." MPEP 2144.08(4)(b). Again, the Office Action fails to do this.

In short, Applicants note that the Office Action fails to apply *any* of the principles articulated in MPEP 2144.08 in order to determine whether or not Stiles does in fact disclose forming a catalyst from a rare earth vanadate. The Office Action fails to consider the size of the genus in Stiles, which is quite large. The Office Action also fails to consider whether Stiles discloses any reason to select the claimed species or subgenus of rare earth vanadates. Finally, the Office Action fails to compare the species actually disclosed in Stiles to determine their similarity, if any, to the claimed rare earth vanadates. For example, Stiles discloses the following species of catalyst compounds:

> Typical catalytic materials which are suitable for use in the method of the invention include: copper chromite, calcium chromate, barium chromate, iron chromite, cobalt chromite, nickel chromite, copper manganite, calcium manganite, iron manganite, cobalt manganite, nickel manganite, calcium molybdate, barium molybdate, calcium tungstate, barium tungstate, ferrous tungstate, manganese tungstate, cobalt tungstate, nickel tungstate, cupric tungstate, calcium cerate, barium cerate, copper cerate, bismuth molybdate, antimony uranate, uranium arsonate, calcium oxide, silver oxide, cuprous oxide, barium oxide, chromic oxide, plumbic oxide, manganese oxide, cobalt oxide and nickel oxide and elemental nickel, cobalt, silver or copper.

Col. 3, lines 3-16.

Applicants note that the actual species enumerated in Stiles do not include vanadate compounds of *any* kind, much less the rare earth vanadates as recited in the claims. Nor has the Office Action compared the actually disclosed species of Stiles with the claimed rare earth vanadates to determine their differences and similarities as required by MPEP 2144.08. As a result, the Office Action fails to make a *prima facie* case of obviousness of the claims over Kleeman and Stiles for this additional reason (*i.e.*, because no showing has been made establishing that Stiles discloses the claimed rare earth vanadates). The Office Action asserts this as mere conjecture.

In conclusion, and for any of the reasons set forth above, Applicants request withdrawal of the rejection of claims 21-30 over Kleeman and Stiles.

(ii) No Rationale For Modifying Kleeman with Stiles

The Office Action alleges that the motivation to combine Stiles with Kleeman is that "catalyst materials can be adhered to support without adversely affect[ing] the catalyst activity (col. 1, lines 29-35)". Applicants submit that this motivation is incorrect because one of skill in the art would not modify the specific catalyst in Kleeman by replacing it with catalyst materials of Stiles that may not actually work for Kleeman's intended purpose. The catalyst taught in Kleemann relates to producing a catalyst for reducing NO_x. This is a reduction process facilitated by the consumption of ammonia. Stiles, on the other hand, simply discloses a generic process for applying any of hundreds, if not thousands, of different catalysts to a support. Stiles does not teach or suggest how to select a catalyst compound, from among the hundreds or thousands disclosed therein, that will work in Kleeman's process to reduce NOx while consuming ammonia in a reduction process. Neither Kleeman nor Stiles identifies "rare earth

vanadates" as being suitable for use as a reduction catalyst for reducing NOx. To select the very species or sub-genus as claimed would require impermissible hindsight reconstruction, using the claimed invention as a guide to pick the species or sub-genus in Stiles that might arguably support the rejection while ignoring the weight of the teachings that suggest a different catalyst than what is claimed.

For this additional reason, Applicants submit that claims 21-30 are not *prima facie* obvious over Kleeman and Stiles.

(iii) Rationale For Rejecting Claim 23 is Incorrect

In rejecting claims 21 and 23, the Office Action asserts that "[a]bsence of SiO_2 makes its wt% 0, therefore the limitation is met." Office action, page 2. However, this rationale can only apply, if at all, to claim 21. It cannot apply to claim 23, which positively recites the inclusion of SiO_2. For this additional reason, the Office action fails to state a *prima facie* case of obviousness relative to claim 23 as previously presented.

(iv) Rationale For Rejecting Claims 26-30 is Incorrect

In rejecting claims 26-30, the Office Action asserts that "a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone." Office Action, pages 3-4. In response, Applicants submit that claims 26-30 positively recite *in the claim body* certain elements not considered in the Office Action. Thus, because the Office Action only focuses on the preambles of claims 26-30, but not their claim bodies, the Office Action fails to properly ascertain the meaning and scope of these claims and therefore fails to state a *prima facie* case of obviousness of claims 26-30 for this additional reason.

Dependent Claims 22-30

Applicants submit that claims 22-30 are allowable for at least the same reasons that claim 21 is allowable.

New Claims 31-33

New claims 31-33 depend from claim 21 and further recite more preferred sub-genera or species of rare earth vanadates, which are neither taught nor suggested in the cited art. Even assuming for the sake of argument that Stiles discloses the sub-genus "rare earth vanadates", Stiles neither teaches nor suggests the specific species recited in claims 31-34, which were found

by Applicants to be more preferred and most preferred embodiments, respectively. Claims 31-34 are therefore further patentable over Kleeman and Stiles for this additional reason.

New Claims 34-37

New independent claim 34 alternatively claims a process for the preparation of a catalyst composition, comprising:

providing a solid support comprising TiO_2 in an amount of at least 70 wt.%, WO_3 in an amount of 5-20 wt.%, and optionally SiO_2 in an amount of up to 15 wt.%;

contacting the solid support with an aqueous solution containing a vanadium salt and a salt of at least one rare earth metal selected from the group consisting of Y, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Er and Yb to form a slurry comprising the solid support and reaction products of the vanadium salt and the salt of the at least one rare earth metal; and

drying and calcining the slurry to yield the catalyst composition.

New claim 34 is patentable over Kleeman and Stiles, which, as discussed above, neither teach nor suggest a process in which a slurry is formed that includes the solid support. Moreover, the combination of Kleeman and Stiles fails to teach or suggest the additional act of "contacting the solid support with an aqueous solution containing a vanadium salt and a salt of at least one rare earth metal selected from the group consisting of Y, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Er and Yb to form a slurry comprising the solid support and reaction products of the vanadium salt and the salt of the at least one rare earth metal". Kleeman fails to disclose or suggest any such step. Stiles only discloses contacting a support with a slurry of *solid catalyst compounds* but not "an *aqueous solution* containing a vanadium salt and a salt of at least one rare earth metal selected from the group consisting of Y, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Er and Yb". For this additional reason, claim 34 and claims 35-37 depending therefrom are further patentable over the combination of Kleeman and Stiles.

New Claims 38-40

New independent claim 38 alternatively claims a process for the preparation of a catalyst composition, comprising:

providing a solid support comprising TiO_2 in an amount of at least 70 wt.%, WO_3 in an amount of 5-20 wt.%, and optionally SiO_2 in an amount of up to 15 wt.%;

contacting the solid support with a vanadium salt and a hydroxide of at least one rare earth metal selected from the group consisting of Y, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Er and Yb to form a slurry comprising the solid support and reaction products of the vanadium salt and the hydroxide of the at least one rare earth metal; and

drying and calcining the slurry to yield the catalyst composition.

New claim 38 is patentable over Kleeman and Stiles, which, as discussed above, neither teach nor suggest a process in which a slurry is formed that includes the solid support. Moreover, the combination of Kleeman and Stiles fails to teach or suggest the additional act of "contacting the solid support with a vanadium salt and a hydroxide of at least one rare earth metal selected from the group consisting of Y, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Er and Yb to form a slurry comprising the solid support and reaction products of the vanadium salt and the hydroxide of the at least one rare earth metal". Kleeman fails to disclose or suggest any such step. Stiles only discloses contacting a support with a slurry of solid catalyst compounds but not "a vanadium salt and a hydroxide of at least one rare earth metal selected from the group consisting of Y, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Er and Yb". For this additional reason, claim 38 and claims 39-40 depending therefrom are further patentable over the combination of Kleeman and Stiles.

Additional Evidence of Patentability

In addition to the foregoing arguments, Applicants submit herewith a copy of the corresponding patent issued by the European Patent Office for claims of similar scope. Because the EPO has particularly strict rules governing novelty and inventive step, the grant of claims of similar scope by the EPO is further evidence of the patentability of the claims as now presented.

Charge Authorization

The Commissioner is hereby authorized to charge payment of any of the following fees that may be applicable to this communication, or credit any overpayment, to Deposit Account No. 23-3178: (1) any filing fees required under 37 CFR § 1.16; (2) any patent application and reexamination processing fees under 37 CFR § 1.17; and/or (3) any post issuance fees under 37 CFR § 1.20. In addition, if any additional extension of time is required, which has not otherwise

been requested, please consider this a petition therefor and charge any additional fees that may be required to Deposit Account No. 23-3178.

CONCLUSION

In view of the foregoing, Applicants submit that the pending claims are allowable. In the event that Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview or overcome by an Examiner's Amendment, Examiner is requested to contact the undersigned attorney.

Dated this 5th day of April 2012.

Respectfully submitted,

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